

Claims

I claim:

1. A method for communicating in an OFDM system comprising the steps
5 of:
multiplexing subcarriers of the OFDM system between at least two
transmit antennas wherein the subcarriers are separated between the at least two
transmit antennas so that a subcarrier and a mirror subcarrier are not transmitted
from a same transmit antenna of the at least two transmit antennas; and
10 transmitting the subcarriers so that adjacent subcarriers are at least two
subcarrier frequency bandwidths apart.
2. The method of communicating as in claim 1 wherein the step of
transmitting further comprises toggling between data to be transmitted and zero.
15
3. The method of communicating as in claim 1 further comprising the step of
receiving the transmitted subcarriers by a receiver system comprising one receive
antenna and one receive processing path.
- 20 4. The method of communicating as in claim 1 further comprising the step of
receiving the transmitted subcarriers from at least two receive antennas
wherein the transmitted subcarriers are separated between the at least two receive
antennas so that the subcarrier and the mirror subcarrier are not received from a
same receive antenna of the at least two receive antennas; and
25 combining the received transmitted subcarriers from the at least two
receive antennas into a single data stream.
5. The method of claim 1 wherein the subcarriers transmitted on a first
transmit antenna of the at least two transmit antennas comprise negative, even
30 subcarriers and positive, odd subcarriers.

6. A method for transmitting subcarriers in an OFDM system comprising the steps of:

multiplexing the subcarriers of the OFDM system between a first transmit antenna and a second transmit antenna wherein the subcarriers are separated

5 between the first transmit antenna and second transmit antenna so that a subcarrier is transmitted on the first transmit antenna and a mirror subcarrier is transmitted on the second transmit antenna; and

toggling between data to be transmitted and zero so that subcarriers transmitted on a same antenna of either the first transmit antenna or the second

10 transmit antenna are separated from an adjacent subcarrier transmitted on the same antenna by two subcarrier frequency bandwidths.

7. A method for receiving subcarriers in an OFDM system comprising the steps of:

15 receiving the subcarriers of the OFDM system from a first receive antenna and a second receive antenna wherein the transmitted subcarriers are separated

such that (i) a subcarrier is received on the first receive antenna and a mirror subcarrier is received on the second receive antenna, and (ii) adjacent subcarriers

20 on a same antenna of the first antenna and the second antenna are separated by two subcarrier frequency bandwidths; and

toggling between the subcarriers received on the first receive antenna and the second receive antenna to create a single data stream.

8. The method of claim 7 wherein the subcarriers received on the first receive antenna comprise negative, even subcarriers and positive, odd subcarriers.

9. A method for communicating in an OFDM system comprising the steps of:

transmitting subcarriers of the OFDM system by multiplexing the

30 subcarriers between at least two transmit antennas wherein the subcarriers are

separated between the at least two transmit antennas so that a subcarrier and a mirror subcarrier are not transmitted from a same transmit antenna of the at least two transmit antennas; and

receiving subcarriers of the OFDM by multiplexing the subcarriers
5 between at least two receive antennas wherein the subcarriers are separated between the at least two receive antennas so that a subcarrier and a mirror subcarrier are not received from a same receive antenna of the at least two receive antennas.

10 10. The method of claim 9 wherein the OFDM system exhibits a reduction in peak to average power ratio related to $1/N$ where N is equal to a number of transmit antennas of the at least two transmit antennas in the OFDM system.

11. An enhanced OFDM system comprising:
15 a transmit multiplexer which separates subcarriers of the OFDM system between at least two transmit antennas;
a switch providing a symbol rate so that adjacent subcarriers on a same antenna of the at least two transmit antennas are at least two subcarrier frequency bandwidths apart; and
20 the at least two transmit antennas which transmit the subcarriers to a receiver of the OFDM system,
wherein a subcarrier and a mirror subcarrier of the subcarriers are not associated with the same transmit antenna of the at least two transmit antennas

25 12. The enhanced OFDM system of claim 11 wherein at least two transmit antennas are used comprising a first transmit antenna and a second antenna.

13. The enhanced OFDM system of claim 11 wherein the receiver comprises one receive antenna and one receive processing path.

12. The enhanced OFDM system of claim 11 further comprising a receiver multiplexer for selecting between a first receive antenna and a second receive antenna.
- 5 13. The enhanced OFDM system of claim 12 whereby corrupted mirror subcarriers are not selected by the receiver multiplexer of the enhanced OFDM system.
- 10 14. The enhanced OFDM system of claim 12 wherein the transmit multiplexer further comprises a processor for processing negative, even subcarriers and positive, odd subcarriers onto the first transmit antenna.
- 15 15. An enhanced OFDM system comprising:
means for multiplexing subcarriers of the OFDM system between at least two transmit antennas wherein the subcarriers are separated between the at least two transmit antennas so that a subcarrier and a mirror subcarrier are not transmitted from a same transmit antenna of the at least two transmit antennas;
and
means for transmitting the subcarriers so that adjacent subcarriers are at least two subcarrier frequency bandwidths apart.
- 20